Proposed Synopsis on

‘‘PHYTOCHEMICAL AND PHARMACOLOGICAL SCREENING OF SOME ETHNOMEDICINAL PLANTS EXTRACTS AND THEIR BIO-ACTIVE FRACTIONS FOR ANTIULCER ACTIVITY”

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ABSTRACT

This study is aimed to evaluate the Antiulcer activity by using some Ethanomedicinal plant extracts and their bioactive fractions with different models. Peptic ulcer disease causes significant mortality and morbidity. Plant kingdom provides a useful source for the development of new antiulcer agents.

From the past few years there is increasing Research interest on the natural compounds, due to their wide variety of pharmacological activities. Recently the world is turn to green/herbal pharmacy because the allopathic drugs having major side effects.

Gastric ulcer is very usual disease; lots of people are affected by that in throughout the world. By searching in an ancient literature, identification of natural drug molecule used in local and tribal medicine pursue investigation into the phytochemical profile are emerging as new trend in drug discovery. Isolation of active molecule, finding of their chemical structure and testing of biochemical activity is also advance fame of work. In this study the Pyhytochemical estimations will be done to evaluate the presence of Phytoconstituents which will be responsible for showing Antiulcer activity.

INTRODUCTION

- Globally, peptic ulcer disease (PUD) is the most common gastrointestinal disorder with significant mortality and morbidity [1]. It is a disease of the gastrointestinal tract (GIT), which includes both gastric and duodenal ulcers. It is characterized by imbalances between offensive (pepsin, gastric acid, and *Helicobacter pylori*) and defensive (prostaglandins, bicarbonate ions, mucin, growth factors, and nitric oxide) factors [2, 3].
- With a high prevalence of *H. pylori* infection, morbidity and mortality of PUD continue to be increased [4]. It is also an important reason for hospitalization worldwide [5]. It claimed about 301,400 lives around the world in 2013 [6, 7]. Patients, who underwent surgery for PUD in Sub-Saharan Africa, indicated that 86% suffered from duodenal ulcers while the rest 14% had gastric ulcer. The major complications like perforation (35%), bleeding (7%), obstruction (30%), and chronic case (28%) will be indicated for surgery, and the overall fatality rate will be found to be 5.7% [8].
- *H. pylori* and consumption of Nonsteroidal anti-inflammatory drugs (NSAIDs) will be common etiologic factors for PUD [9, 10]. Stress, tobacco smoking, alcohol intake, Zollinger Ellison syndrome, and age-related decline in prostaglandin levels are also mentioned as risk factors for PUD [11]. Currently used antiulcer drugs cause adverse reactions, such as hypersensitivity, arrhythmia, impotence, gynecomastia, hematopoietic changes, and kidney disease [10, 12].
- These drugs also result in significant drug-drug interactions that limit the potential use of these agents [13, 14].Traditional medicine plays a great role in providing primary health care worldwide [15]. About 75–80% people in developing countries use traditional medicine because of better cultural acceptability, better compatibility with the human body, and lesser side effects [10].

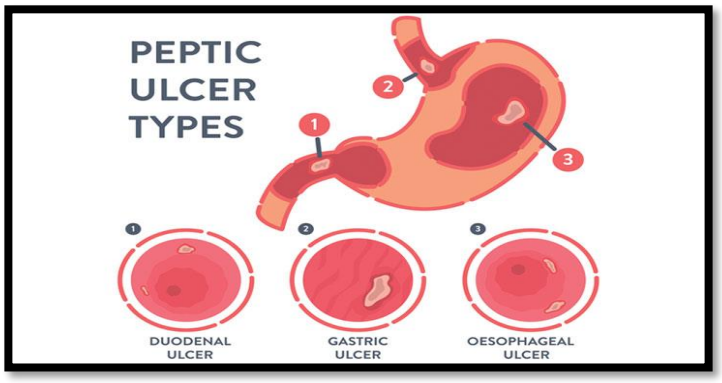

Image no.01- Types of peptic ulcer

Chart no. 01- Causes of Peptic Ulcer

- Gastric ulcer may cause the nausea, vomiting where as its pain produce weight loss and anorexia.
- One forth percentage of people is suffering from gastric ulcer which causes hemorrhage some time. There is significantly rising in the complication and death because of gastric ulcers. Gastric ulcer is very usual disease; lots of people are affected by that in throughout the world. Because of that there is arising in the mortality rate. In United state four million people have peptic ulcer and each year 3,50,000 new cases reported. Allopathic treatment is base on the observation and etiology of disease is base on manifestation of an abnormal physiology.
- Herbal medicine as a major part of traditional medicine has been used in medicinal practice since antiquity and is a common element of Ayurvedic, Homeopathic and Naturopathic medicines.
- Extensive literature survey reveals that medicinal plants posses numerous phytochemical constituents like Alkaloids, Glycosides, Flavonoids, Phenols, Tannins Saponins etc, which may be beneficial for treating various diseases like peptic ulcer or any other GIT related disease, hence the present will be used to screen phytochemicals for its effectiveness in Gastric ulceration along with its potential for Anti-Ulcer activity. so the study is aimed for, **‘‘Phytochemical and Pharmacological Screening of Some Ethnomedicinal Plants Extracts and their Bioactive Fractions for Antiulcer Activity”**

LITERATURE REVIEW FOR PLANT

Any two or three plants will be selected from below given list. If necessary further literature will carried out for more plants.

Sr no.	Plant name	Family	Part of the plant	Pharmacological activities	Reference
01	***Psidium guajava***	Myrtaceae	Stem bark	Anti-diabetic Activity, antigiardiasic activity, Anti- malarial activity	Rohit Kumar Bijauliya 2017
02	***Annona reticulata***	Annonaceae	Stem bark	Analgesic and anti-inflammatory activity	Prasad G. Jamkhande 2015
03	***Ruelia tuberosa***	Acanthaceae	Stem bark	Anticholinesterase insecticidal antifertility anthelmintic antihyperlipidemic, hepatoprotective and antidiabetic activities	Zaw Min Thu 2018
04	***Benincasa hispida***	Cucurbitaceae	Stem	Antidiabetic activity	Muhammad Torequl Islam .2021
05	***Nyctanthes arbor tritis***	Oleaceae	Stem bark	Anticancer Activity, anti-diabetic activity	Reema Srivastava. 2018
06	***Ziziphus mariatana***	Rhamnaceae	Seeds	Anti-hypoglycemic activity, Free radical scavenging activity & inhibitory response	Zhong Yao Cai. 2014
07	***Limonia accidismma***	Rutaceae	Stem bark	Hepatoprotective activity, antiasthmatic activity	Rashmi Srivastava. 2019
09	***Citrus sinesis***	Rutaceae	Leaves or Stem bark	Antiosteoporosis Activity and Anti - asthmatic	Priya Chand. 2020
10	***Julgans regia(walnut)***	Juglandaceae	Stem bark	Anti-helmentic, astringent and detergent, tooth cleaner and whitener	Ali Esmail Al-Snafi 2018 Ali Jahanban-Esfahlan 2019

LITERATURE REVIEW FOR ANTIULCER ACTIVITY

Sr no.	Plant	Methods	Conclusion	Reference
1	***Ficus thonningii***	Ethanol-Induced Ulcer ModelIndomethacin-Induced Ulcer Model.	The hydro-methanol crude extract and aqueous solvent fraction of the stem bark of *F. thonningii* have an antiulcer effect.	**HabtalemAdane. 2021**
2	***Urtica simensis***	Pylorus Ligation-Induced Ulcer, Cold Restraint Stress-Induced Ulcer, Acetic Acid-Induced Chronic Ulcer	The extract has a promising antiulcer activity on pyloric ligation, cold-restraint stress-induced acute, and acetic acid-induced chronic ulcer models, which corroborates its cultural therapeutic role	**WoretawSisay.2021**
3	***Osyris quadripartite Decne***	Pylorus ligation model, Ethanol-induced ulcer model	The findings in this study confirm, the absence of oral acute toxicity at the doses employed, and presence of anti-ulcer pharmacologic activity of OQ.	**Mastewal Abebaw Bharat Mishra. 2017**
4	***Heliotropium indicum Linn***	Pylorus Ligation-Induced Ulcer Aspirin Ligation-Induced Ulcer	The ethanol extract of Heliotropium indicum Linn. leaves possess significant antiulcer properties in a dose dependent manner and It	**Basak M.2021**

			showed also a significant decrease in a number of ulcers and ulcer score index in aspirin plus pylorus ligation induced ulceration model	
5.	***Centella asiatica***	indomethacin-induced ulcer in rats	*C. asiatica* leaf extract (50 or 250 mg/kg) evidenced a pronounced gastroprotective activity against indomethacin-induced ulcer in rats that could be attributed to its ability to inhibit lipid peroxidation and to stimulate gastric mucus secretion in the rat gastric mucosa	**Zheng H.M. 2016**
6.	***Capparis zeylanica***	Naproxen-induced ulcer model, histamine-induced ulcer model and ethanol-induced ulcer model	*C. zeylanica* possess antiulcer and anti-helicobacter activities.	**Abhishek Tripathi. 2021**

AIM AND OBJECTIVES OF RESEARCH WORK

AIM: ‘‘Phytochemical and Pharmacological Screening of Some Ethnomedicinal Plants Extracts and Their Bioactive Fractions for Antiulcer Activity”

OBJECTIVES:

i) Phytochemical investigation and standardization of selected medicinal plant extract and its fraction characterization for presence of phytoconstituents.

ii) Safe dose Calculations

iii) Preclinical Pharmacological evaluation of plant extracts and its bioactive fraction for Anti-ulcer activity.

iv) Interpretation of Data

IMPORTANCE OF STUDY

- Nowadays people change their lifestyle and they are getting adapted for junk-food which can only fill the stomach without any nutrient supply. It can majorly damage the gastric intestinal track and form the gastric ulcer. Gastric ulcer can easily seen in the major population.

- Gastric ulcer may cause the nausea, vomiting where as its pain produce weight loss and anorexia. One forth percentage of people is suffering from gastric ulcer which causes hemorrhage some time.

- There is significantly rising in the complication and death because of gastric ulcers. Gastric ulcer is very usual disease; lots of people are affected by that in throughout the world. Because of that there is arising in the mortality rate. In United state four million people have peptic ulcer and each year 3,50,000 new cases reported. In market there are lots of medicines have been used to treat GI ulcer like H2 receptor antagonists frequently used for the gastric ulcer. But it having some adverse effect like pain, skin rash, weakness, and arrhythmia.

- So there is always need for safer drug to treat gastric ulcer and herbal medicine is always good option to treat gastric ulcer because of drugs are more safe, freely available, less toxic and more important that they are more compatible with human body.

PLAN OF WORK

1. **Literature review**
2. **Collection, Identification and authentication of selected plant material**
3. **Processing of Crude drug**
4. **Pharmacognostic Evaluation of plant material**
5. **Phytochemical Screening of Plant material**
6. **Extraction of selected plant materials-**
   - i) Selection of Extraction method
   - ii) Selection of Solvent
7. **Phytochemical Qualitative analysis of extract for presence of -**
   - i) Carbohydrates, tannins, saponins, alkaloids, triterpinoids, glycosides, lipids, flavonoids, phenols, proteins, steroids etc in plant extracts.
   - ii) TLC fingerprinting
   - iii) Standardization of extracts for-
     a. Total polyphenols,
     b. Total flavonoid
8. **Pharmacological Screening of selected plant extracts for-**
   - i) In Vitro-Antioxidant study
   - ii) Safe dose Calculation
   - iii) In Vivo models for Anti-Ulcer Activity
     a. Aspirin (ASP)-induced ulcers/Indomethacin induced ulcers
     b. Ethanol (EtOH)-induced ulcers
     c. Cold-restraint stress (CRS)-induced ulcers
     d. Pylorus ligated (PL) induced ulcers.
   - vi) Histopathological study
9. **Fractionation of selected extract/s with better biological activity**
10. **Characterization of selected fractions-**
    - i) Phytochemical Qualitative analysis
    - ii) TLC fingerprinting
    - iii) Phytochemical Standardization of fractions by total polyphenols and flavonoids content.
11. **Pharmacological Screening of selected fractions for Anti-Ulcer activity**
12. **Interpretation of data and its presentation.**

METHODOLOGY TO BE ADOPTED

1. **Plant Material:**

   Selected plant parts will be collected from local known sources and get authenticated from expert Botanist of the region.

2. **Processing of crude drug:**

   Collected crude drug subjected to processing such as drying, grinding, sieving etc as per official standards.

3. **Pharmacognostic Evaluation of plant material:**

   Parts of selected plants subjected to Pharmacognostic evaluation viz;

   a. Morphological Evaluation
   b. Microscopical evaluation and powder characteristics

4. **Phytochemical Screening of Plant material:**

   Phytochemical examinations will be carried out for extracts as per the standard methods. It includes estimation for extractive value, acid &water soluble ash, LOD, presence of foreign matter, heavy metal content, microbial contamination etc. Qualitative & quantitative analysis carried out for detection of phytoconstituents and later confirmed by using suitable technique.

5. **Extraction of Plant material:**

   Powder form of selected individual plant material will be subjected to extraction. The choice of solvent for extraction methods will be decided according to chemical constituents of selected plants part and nature of chemical constituents.

6. **Phytochemical Qualitative and Quantitative analysis of extract for presence of:**

   Qualitative analysis includes identification test for presence of Carbohydrates, tannins, saponins, alkaloids, triterpinoids, glycosides, lipids, flavonoids, phenols, proteins, steroids etc in plant extracts.TLC Fingerprinting and Quantitative analysis or Standardization of extracts.

7. **Pharmacological Screening of plant extracts:**

   Selected plant part extracts will be evaluated for-

i. **In Vitro-Antioxidant study:**

In vitro antioxidant activities for the extracts will be carried out using the following methods.

a. DPPH assay
b. Hydrogen peroxide scavenging assay.
c. Nitric oxide scavenging activity

d. Ferric chloride scavenging activity

Any two methods from above will be used for Anti-oxidant activity/Further literature will be done for any other method to estimate Anti-oxidant activity.

ii. Safe dose calculation:

Safe dose calculation of plant extracts for the purpose of use of extracts for efficacy evaluation carried out as per OECD Guidelines for 'Acute Toxicity study: Class Method (423)'.

iii. In Vivo Anti-Ulcer activity

a. Aspirin (ASP)-induced ulcers/Indomethacin induced ulcers
b. Ethanol (EtOH)-induced ulcers
c. Pylorus ligated (PL) induced ulcers
d. Cold-restraint stress (CRS)-induced ulcers

From above mentioned list any two or three models will be used for evaluation of anti ulcer activity. Further literature will be carried out for any other model to evaluate Anti-ulcer activity.

iv. Histopathological studies:

Each histological section will be examined for epithelial erosion, oedema in the sub mucosa haemorrhagic damage and the presence of inflammatory cells.

8. Fractionation of selected extract/s:

The method and solvent for fractionation will be decided according to chemical constituents of selected extract/s and nature of chemical constituents.

9. Characterization of selected fractions.

Phytochemical examinations will be carried out for all the fractions as per the standard methods. Qualitative analysis will be carried out for detection of phytoconstituents and later confirmed by using suitable chromatographic technique. Quantitative analysis or Standardization fractions.

10. Pharmacological Screening of selected fractions for Anti-Ulcer activity

In Vivo Anti-Ulcer activity

a. Aspirin (ASP)-induced ulcers/Indomethacin induced ulcers
b. Ethanol (EtOH)-induced ulcers/
c. Pylorus ligated (PL) induced ulcers/
d. Cold-restraint stress (CRS)-induced ulcers/

From above mentioned list any two or three models will be used for evaluation of Anti-Ulcer Activity. Further literature will be carried out for any other model to evaluate Anti-ulcer activity.

11. Interpretation of Data and Its Presentation

- All the Data collected that for Pharmacognostic evaluation of selected plants part will be presented in tabular form graphical form and microscopic observation presented as figures of TS & for powder characteristics.
- Qualitative evaluation of plant extracts for the content of phytoconstituents presented as either present (+ve) or absent (-ve) and presence of phytoconstituents confirmed by TLC by comparing with Rf value of standard. Fractioned extracts will be subjected for phytoconstituents characterization by suitable methods.
- Safe dose calculated as $1/10^{th}$ dose of LD_{50} value of plant extracts.
- The assessment of Extracts and Fractioned extracts for Anti-Ulcer activity observed through decreases in gastric acidity stomach secretion, a significant increase in pH and mucus content by pretreatment of the crude extracts/fractions. And in histological study epithelial erosion, edema in the sub mucosa, hemorrhagic damage and the presence of inflammatory cells.
- All the data related to efficacy of extracts and fractions of selected plants part subjected to statistical analysis.

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